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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT MANZKE, ROLAND PROKSA,
ANNE MORAWSKI NEUBAUER, and
CARSTEN OLIVER SCHIRRA

Appeal 2018-006606
Application 14/354,191
Technology Center 2600

Before JOHN A. JEFFERY, DENISE M. POTHIER, and JUSTIN BUSCH,
Administrative Patent Judges.

BUSCH, *Administrative Patent Judge.*

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellants¹ appeal from the Examiner's decision to reject claims 1–20, which constitute all the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

¹ Appellants identify the real party in interest as Koninklijke Philips N.V. App. Br. 2.

CLAIMED SUBJECT MATTER

“Cardiac catheter ablation, generally, is a minimally invasive medical procedure in which a catheter, having a radiofrequency emitter disposed at its tip, is passed within a vessel . . . where the emitter is activated to emit an electrical signal to ablate particular tissue such as cardiac cells.”

Spec. 1:17–21. “Unfortunately, cardiac catheter ablation procedures are often unsuccessful due to the lack of adequate ablation assessment to ensure the suitable ablation of the tissue of interest has been performed.” *Id.* at 1:25–28.

Appellants’ invention relates to “performing a contrast enhanced scan of scar tissue created by ablation using a contrast agent targeted to the scar tissue and analyzing the resulting image(s) to assess the ablation.” *Id.* at 2:32–34. According to Appellants’ Specification, “the assessment can be utilized to determine whether further ablation should be performed, thereby mitigating unsuccessful ablation due to lack of adequate ablation assessment.” *Id.* at 2:34–3:2.

Claim 1 is representative and reproduced below:

1. An analyzer, comprising:
 - a quantifier including one or more processors configured to quantify an amount of contrast material representing scar tissue created by ablation for tissue of interest in contrast enhanced imaging data; and
 - a recommender including the one or more processors configured to generate a signal indicative of a recommendation to further ablate the tissue of interest in response to the quantified amount of the contrast material not satisfying a pre-determined threshold.

REJECTIONS

Claims 1–20 stand rejected under 35 U.S.C. § 101, as being directed to ineligible subject matter. Final Act. 3–5.

Claims 1–20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Toms (US 2006/0173362 A1; Aug. 3, 2006) and van der Weide (US 2008/0147056 A1; June 19, 2008) (“Weide”). Final Act. 5–10.²

ANALYSIS

THE PATENT INELIGIBLE SUBJECT MATTER REJECTION

Principles of Law

An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: “[L]aws of nature, natural phenomena, and abstract ideas’ are not patentable.” *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70 (2012) (brackets in original) (citing *Diamond v. Diehr*, 450 U.S. 175, 185 (1981)).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court’s two-step framework, described in *Mayo* and *Alice*. *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 217–18 (2014)

² On the record before us, despite the Examiner indicating claims 1–20 are rejected under 35 U.S.C. § 102(b) in the header of the rejection (Final Act. 5; Ans. 4), we presume that the Examiner rejected claims 1–20 under § 103(a). Appellants address the rejection as being under § 103(a). App. Br. 9–19; Reply Br. 4–11. Accordingly, we deem the Examiner’s error in this regard as harmless.

(citing *Mayo*, 566 U.S. at 75–77). In accordance with that framework, we first determine what concept the claim is “directed to.” *See id.* at 218–19 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk.”).

Concepts determined to be abstract ideas, and, thus, patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as “molding rubber products” (*Diehr*, 450 U.S. at 191); “tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. (15 How.) 252, 267–68 (1854))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.” *Diehr*, 450 U.S. at 187; *see also id.* at 192 (“We view respondents’ claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula.”). That said, the Supreme Court also indicated that a claim “seeking patent

protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.” *Id.* (citing *Benson* and *Flook*); *see, e.g., id.* at 187 (“It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”).

If the claim is “directed to” an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where “we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Alice*, 573 U.S. at 221 (quotation marks omitted). “A claim that recites an abstract idea must include ‘additional features’ to ensure ‘that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].’” *Id.* (brackets in original) (quoting *Mayo*, 566 U.S. at 77). “[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention.” *Id.*

In January 2019, the USPTO published revised guidance on the application of § 101. 2019 REVISED PATENT SUBJECT MATTER ELIGIBILITY GUIDANCE, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Guidelines”). Under that guidance, we first look to whether the claim recites:

- (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activities such as a fundamental economic practice, or mental processes); and

(2) additional elements that integrate the judicial exception into a practical application (*see* MANUAL OF PATENT EXAMINING PROCEDURE (MPEP) §§ 2106.05(a)–(c), (e)–(h) (9th ed. Rev. 08.2017, Jan. 2018)). Only if a claim (1) recites a judicial exception, and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not well-understood, routine, and conventional in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, and conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See 84 Fed. Reg. 50.

Claims 1, 2, and 4–20

Step 1 of the Guidelines

Under the Guidelines, we must first determine whether the claims fall within the four statutory categories of patent subject matter identified by 35 U.S.C. § 101. Independent claim 1 recites an analyzer comprising two elements: (1) a quantifier including one or more processors configured to quantify an amount of contrast material representing scar tissue created by ablation for tissue of interest in contrast enhanced imaging data, and (2) a recommender including the one or more processors configured to generate a signal indicative of a recommendation to further ablate the tissue of interest in response to the quantified amount of the contrast material not satisfying a pre-determined threshold.

We initially note that claim 1 recites an analyzer comprising one or more processors, a machine. Thus, claim 1 is directed to one of the four statutory categories of § 101. Despite falling within this statutory category, we must still determine whether the claim is directed to a judicial exception, namely an abstract idea. *See Alice*, 573 U.S. at 218. To this end, we must determine whether the claim recites a judicial exception. *See* 84 Fed. Reg. 50, 54. If the claim recites a judicial exception, we must determine whether the claim fails to integrate the exception into a practical application. *See id.* at 54–55. If both elements are satisfied, the claim is directed to a judicial exception under the first step of the *Alice/Mayo* test, which the Guidelines refer to as Step 2A. *See id.*

Step 2A, Prong 1 of the Guidelines

In the rejection, the Examiner concludes the claims are comparable to the claim in *SmartGene, Inc. v Advanced Biological Labs.*, 555 F. App’x. 950 (Fed. Cir. 2014). Final Act. 4. Our reviewing court determined the claim in *SmartGene* “involves a mental process excluded from section 101: the mental steps of comparing new and stored information and using rules to identify medical options.” *SmartGene*, 555 F. App’x. 950 at 955.

To determine whether a claim recites an abstract idea, we (1) identify the claim’s specific limitations that recite an abstract idea, and (2) determine whether the identified limitations fall within certain subject matter groupings, namely (a) mathematical concepts; (b) certain methods of organizing human activity; or (c) mental processes. Mental processes are concepts performed in the human mind including an observation, evaluation, judgment, or opinion. *See* 84 Fed. Reg. 50, 52. Unless the claim cannot

practically be performed in the mind, the claim is in the mental process category if the claim, under its broadest reasonable interpretation, covers performance in the mind but for the recitation of generic computer components. *See id.* at 52 n.14.

Here, we find claim 1, under its broadest reasonable interpretation, covers performance in the human mind but for the recitation of generic computer components. That is, the human mind can practically quantify an amount of contrast material representing scar tissue created by ablation for tissue of interest in contrast enhanced imaging data. For example, the human mind can determine how much of a contrast enhanced imaging data contains bright areas and dark areas. The human mind can also practically generate a recommendation to further ablate the tissue of interest in response to the quantified amount of the contrast material not satisfying a pre-determined threshold. For example, the human mind can recommend that the amount of bright area in the contrast enhanced image is not enough.

Accordingly, each of the recited functions in claim 1 is a mental step that is part of the abstract idea of evaluating an image to determine the amount of contrast material representing ablated tissue and outputting an indication to recommend further ablation in response to determining the amount of contrast is below a threshold. Thus, the claim recites an abstract idea based on these mental processes.

Step 2A, Prong 2 of the Guidelines

Although the claim recites an abstract idea based on these mental processes, we must then determine whether the abstract idea is integrated into a practical application, namely whether the claim applies, relies on, or

uses the abstract idea in a manner that imposes a meaningful limit on the abstract idea, such that the claim is more than a drafting effort designed to monopolize the abstract idea. *See* 84 Fed. Reg. 50, 54–55. To this end, we (1) identify whether there any additionally recited elements beyond the abstract idea, and (2) evaluate those elements individually and collectively to determine whether they integrate the exception into a practical application. *See id.* at 55.

As discussed above, each of the recited functions in claim 1 is a mental step that is part of the abstract idea. Only the generically recited computer components and recommender-generated signal³ constitute additional elements beyond the abstract idea in claim 1. Specifically, the “quantifier including one or more processors,” the “recommender including the one or more processors,” and the “signal indicative of a recommendation”⁴ are additional elements beyond the abstract idea.

The machine-or-transformation test, although not the only test, can nevertheless indicate whether additional elements integrate the exception into a practical application. *See id.* (citing MPEP §§ 2106.05(b), (c)).

³ The signal itself could be considered part of the abstract idea because, considering the claim without the generically recited recommender having one or more processors, the signal encompasses, for example, a simple verbal signal (e.g., “yes, continue to ablate”) or a hand gesture indicating the same. Nevertheless, for purposes of this decision, we treat and address the signal as an additional element. Regardless, the indication of recommendation is part of the abstract idea.

⁴ As explained in the previous footnote, the indication of a recommendation, itself is part of the abstract idea but, as discussed in the previous footnote, for purposes of this decision, we consider the signal itself to be an additional element beyond the abstract idea

Accord Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 716 (Fed. Cir. 2014) (quoting *Bilski*, 561 U.S. at 594). Under the machine-or-transformation test, a claimed process is patent-eligible if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing. *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008), *aff'd sub nom. Bilski*, 561 U.S. at 593. According to the Federal Circuit in *Bilski*, the transformation (1) must transform an underlying article to a different state or thing, and (2) must be central to the purpose of Appellants' claimed process. *Id.* at 962. Although an underlying article can be intangible, such as electrical signals, and transformation can include data transformation, the data must represent a physical object or an article. *Id.* at 962–63 (citing *In re Abele*, 684 F.2d 902, 908–09 (CCPA 1982)).

Although the machine-or-transformation test is generally applied to process claims, the apparatus claims here are substantively similar to method claim 15, so we see no reason to treat claims 1–14 any differently with respect to their eligibility, just as the U.S. Supreme Court did for the system claims in *Alice*. See *Alice*, 573 U.S. at 208 (“[T]he system claims are no different from the method claims in substance.”). This approach is also consistent with the Federal Circuit’s approach for the computer-readable medium claims in *CyberSource*, as well as its predecessor court’s treating an apparatus claim as a method claim for eligibility purposes in *Abele*. See *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1374 (Fed. Cir. 2011) (noting that the underlying invention for both the method and computer-readable medium claims were a *method* for detecting credit card fraud—not a manufacture for storing computer-readable information); see

also id. (noting that the *Abele* court treated apparatus claim 7 as a method claim for purposes of determining eligibility).

We find unavailing Appellants' contention that claims 1, 2, and 4–20 are eligible based on the Court's reasoning in *Abele*. App. Br. 6–7; Reply Br. 3–4. In *Abele*, the Court held a process for calculating certain values for a data point in a field and displaying the value as a signed gray scale at a point in an image corresponding to the data point was “directed solely to the mathematical algorithm portion of appellants' invention and,” thus, ineligible. *Cf. Abele*, 684 F.2d 902 at 908.⁵ On the other hand, the court reached a different result with respect to dependent claim 6, which further recited that the data, on which the algorithm was performed in order to graphically display an image, was “X-ray attenuation data produced in a two dimensional field by a computed tomography scanner.” *Id.* The court determined dependent claim 6 was patent eligible because the dependent claim required “X-ray attenuation data.” The court reasoned the X-ray attenuation data could be obtained only by passing an X-ray beam, produced by a computerized axial tomography (CAT) scanner, through physical and

⁵ As discussed above, mathematical concepts (e.g., mathematical relationships, formula, and equations) are one category of abstract idea; mental processes (e.g., concepts performed in the human mind, such as evaluation, judgment, and opinion) are another. 84 Fed. Reg. 52. The question of whether *Abele*'s claims recited more than the mathematical algorithm is analogous to our question of whether Appellants' claims recite more than the mental processes. *See also CyberSource*, 654 F.3d at 1375 (“*Abele* made clear that the basic character of a process claim drawn to an abstract idea is not changed by claiming only its performance by computers, or by claiming the process embodied in program instructions on a computer readable medium.”).

tangible objects such as bones, organs, and body tissues and detecting the beam upon its exit. *Id.*; see *Bilski*, 545 F.3d at 962–63.

Claim 1 recites functions that “quantify an amount of contrast material representing scar tissue created by ablation for tissue of interest in contrast enhanced imaging data” and compare that amount to a threshold. But the recited “quantify[ing] an amount of contrast material” in contrast enhanced imaging data and comparing that amount to a threshold is merely that—*quantification and comparison of data*. Moreover, generating a signal based on the results of the comparison merely provides a signal indicating the result of the comparison. Even considering the signal as an additional element beyond the abstract idea, outputting results is merely insignificant post-solution activity that fails to integrate the abstract idea into a practical application. See 84 Fed. Reg. 50, 55 n.31 (citing MPEP § 2106.05(g)). We see no difference between claim 1’s recitation of quantifying and comparing data and outputting a result (i.e., a signal) and *Abele* claim 5’s recited calculation/comparison and outputting the results (i.e., displaying the value in a picture), which the court found ineligible. Thus, claim 1 fails to recite an element that integrates the judicial exception into a practical application.

Step 2B of the Guidelines

Although the claim does not integrate the judicial exception into a practical application, we must determine whether additional elements of the claim, individually or in combination, provide an inventive concept. See 84 Fed. Reg. 50, 56. To this end, we determine whether the additional elements (1) add a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the field, which is indicative

that an inventive concept may be present; or (2) simply append well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception, which is indicative that an inventive concept may not be present. *Id.*

The Examiner concludes under step two in the *Mayo/Alice* framework that claim 1 uses one or more generic processors, but that these processors do not add significantly more to the abstract idea. Final Act. 4. According to the Examiner, the generic processors are routine and conventional in the art of image processing. *Id.*

Appellants do not sufficiently challenge this determination that the additional elements operate in their conventional manner. The disclosure describes the additional elements (i.e., the quantifier and recommender, including the one or more processors) and the signal indicative of a recommendation, in generalities. Spec. 5:10–16; 7:1–6. Contrary to Appellants’ contention (Reply Br. 2–3), using a computer processor for “quantifying” and “generating” information simply takes advantage of some of the “most basic functions [of] a computer.” *Cf. Alice*, 573 U.S. at 225 (the “use of a computer to obtain data, adjust account balances, and issue automated instructions; all of these computer functions are ‘well-understood, routine, conventional activit[ies]’ previously known to the industry.”) (quoting *Mayo*, 566 U.S. at 71–73); *Benson*, 409 U.S. at 65 (noting that a “computer operates then upon both new and previously stored data. The general-purpose computer is designed to perform operations under many different programs.”). Although the Examiner finds that *applying contrast agent* to scar tissue is well known, routine, and conventional in the art

(Reply Br. 3), Appellants' contention that Weide does not support this finding is not persuasive of error, because the claim does not recite applying a contrast agent to scar tissue.

As we discussed above, we determine the “quantifier including one or more processors,” the “recommender including the one or more processors,” and the “signal indicative of a recommendation” are the additional elements beyond the abstract idea. The quantifier and recommender are just labels describing generic computing elements based on the function the particular elements perform. Although the quantifier and recommender include the “one or more processors,” the processors also are generic computer components recited at a high level of generality. Finally, the generated signal is one of the most basic functions performed by computers or processors. Accordingly, these generic computing components and the signal, each of which is recited at a high level of generality, are merely well-understood, routine, and conventional elements performing well-understood, routine, and conventional functions.

Therefore, we are not persuaded the Examiner erred in rejecting independent claim 1, and claims 2, 4–17, 19, and 20, which Appellants did not argue separately with particularity.

Claims 3 and 18

Step 2A, Prong 1 of the Guidelines

Claim 3 indirectly depends from independent claim 1, thereby including all the limitations of claim 1. *See* 37 C.F.R. § 1.75. Thus, for the reasons discussed above concerning claim 1, we find claim 3, recites an abstract idea for the reasons discussed above.

Step 2A, Prong 2 of the Guidelines

Claim 3 recites that “the contrast image is a K-edge image generated by a computed tomography (CT) imaging scanner emitting poly-energetic x-ray radiation.” Claim 18 depends from method claim 15 and recites similar limitations, namely that “the contrast enhanced imaging data includes at least one of computed tomography contrast enhanced imaging data or x-ray contrast enhanced imaging data.” Therefore, even though Appellants do not argue dependent claim 18 separately, we group claim 18 with claim 3. As the Specification explains, a detector array includes detector pixels that detect radiation traversing the tissue of interest. Spec. 3:29–32. A detector array generates an electrical signal indicative of the detected radiation that traverses the tissue of interest. *Id.* at 4:2–3.

Although claim 3, on its face, appears to merely limit the source of the image analyzed in claim 1, claim 3 is strikingly similar to claim 6 in *Abele*, which the court determined was directed to eligible subject matter. *Abele*, 684 F.2d at 908. Specifically, the Court determined *Abele*’s claim 6 recited eligible subject matter because “the method of claim 6, unlike that of claim 5, requires ‘X-ray attenuation data,’” which the Specification indicated was “available only when an X-ray beam is produced by a CAT scanner, passed through an object, and detected upon its exit.” *Id.* Because the data was required to be produced by a certain set of steps, the court apparently determined that those steps were part of the method recited in claim 6. *Id.* (“Were we to view the claim absent the algorithm, the production, detection and display steps would still be present and would result in a conventional CAT-scan process. Accordingly, production and detection cannot be

considered mere antecedent steps to obtain values for solving the algorithm”).

Therefore, due to the striking similarity between Appellants’ claim 3 and *Abele*’s claim 6, we determine Appellants’ claim 3 recites a patent-eligible transformation, namely transforming the X-ray data emitted from Appellants’ CT imaging scanner passes through the tissue of interest into a K-edge image—a transformation of data that represents a physical object, namely the tissue of interest. *See* Spec. 3:19–4:20; Reply Br. 9 (noting the principles here are indistinguishable from those in *Abele*). The Examiner’s finding that there is no improvement of contrast enhanced imaging technology (Ans. 10) does not consider the other exemplary considerations in determining whether a judicial exception is integrated into a practical application. *See* 84 Fed. Reg. 50, 55. As such, the claim recites additional elements that integrate the exception into a practical application. *See id.* at 55 n.28 (citing MPEP § 2106.05(c)).

In conclusion, although claim 3 recites an abstract idea, namely a mental process, the claim nevertheless integrates that abstract idea into a practical application by applying, relying on, or using the abstract idea in a manner that imposes a meaningful limit on the abstract idea. *See id.* at 54–55.

Therefore, we are persuaded that the Examiner erred in rejecting claim 3 and claim 18, which recites similar limitations.

THE OBVIOUSNESS REJECTION

Claims 1 and 10–14

The Examiner determines that the combination of Toms and Weide renders claim 1 obvious, regardless of whether scar tissue created by ablation is non-functional descriptive material.⁶ Final Act. 5–6. In particular, the Examiner finds Toms discloses many recited elements of independent claim 1 including, among other things, quantifying an amount of contrast material representing tissue of interest in contrast enhanced imaging data. *Id.* at 5 (citing Toms ¶¶ 10, 14, 60, 71). Although the Examiner acknowledges that Toms’ contrast material does not represent scar tissue created by ablation, the Examiner cites Weide in combination with Toms for teaching this feature in concluding that the claim would have been obvious. *Id.* at 6 (citing Weide ¶¶ 128 and 150). That is, the Examiner cites Weide merely to show that modifying Toms’ teaching of quantifying an amount of contrast material in contrast enhanced imaging data so that the contrast material represents scar tissue created by ablation would have been obvious.

Therefore, Appellants’ argument that Weide does not teach a contrast material representing scar issue (App. Br. 10; Reply Br. 5–6) is unavailing

⁶ The Examiner determines the nature of the tissue is non-functional descriptive material. However, the Examiner also finds the prior art teaches the subject matter recited in claim 1, *including* the subject matter the Examiner determines is non-functional descriptive material. For the reasons discussed below, Appellants do not persuade us the Examiner erred in finding that the prior art teaches or suggests the entirety of the recited subject matter. Therefore, we do not reach the issue of non-functional descriptive material.

because the rejection is not based solely on Weide, but rather on the cited references' collective teachings. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Appellants' argument that Weide does not teach quantifying an amount of contrast agent (App. Br. 10) is not germane to the rejection because Weide was cited for teaching scar tissue created by ablation.

Nor do we find availing Appellants' contention that Weide does not teach scar tissue. App. Br. 10; Reply Br. 5–6. Appellants' Specification does not define the term “scar tissue.” We, therefore, construe the term “scar” in accordance with its plain meaning, namely “[a] mark . . . resulting from . . . contact.” *THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE* 1611 (n. def. 4) (3rd ed. 1992).

Weide relates to medical procedures that deliver energy to tissue. Weide, Abstract. Weide's “thermal ablation” procedure delivers energy to a tissue region that changes the region during and after the thermal ablation procedure. *Id.* ¶ 128. Weide's thermal ablation procedure, then, at least suggests producing a mark on the tissue region resulting from contact with the delivered energy (e.g., forms scar tissue).⁷

⁷ Notably, Weide explicitly discloses that “the present invention provides software designed to automatically obtain images of a tissue region (e.g., . . . CT imaging . . .), automatically detect any changes in the tissue region (e.g., . . . *amount of necrotic tissue* . . .), and based on the detection to automatically adjust the amount of energy delivered to the tissue region.” Weide ¶ 129 (emphasis added).

Therefore, we are not persuaded that the Examiner erred in rejecting claim 1 and claims 10–14 not argued separately with particularity.

Claims 2–8

We do not sustain the Examiner’s rejection of claim 2. Final Act. 6–7. Claim 2 recites “a combiner including the one or more processors configured to combine a contrast image representing the contrast material of the tissue of interest and a structural image of the tissue of interest, wherein the combination image is visually presented.” We begin by noting that, although there is no explicit antecedent basis for “the combination image,” we construe “the combination image” as referring to an image resulting from *combining* the contrast image and the structural image.

The Examiner finds Toms teaches the recited combination image in Figures 14–18. According to the Examiner, the “broadest reasonable interpretation of ‘a combined image’ is just an image that has all different images together side by side, just like how the images in [Figures] 14–18 are arranged.” Ans. 14. Appellants argue the Examiner’s interpretation is not reasonable to a person having ordinary skill in the art. Reply Br. 6. We agree.

According to Appellants’ Specification, “a contrast material image and a structural image may be combined in a single image and/or displayed next to each other.” Spec. 4:18–20. Thus, Appellants’ Specification indicates that the contrast material image and the structural image may be either *combined* into a single image *or displayed* next to each other. Thus, contrary to the Examiner’s finding, Toms’ slice levels *displayed* in Figures 14–18 next to each other are not *combined* because such a construction

would not constitute “an interpretation that corresponds with what and how the inventor describes his invention in the specification, i.e., an interpretation that is ‘consistent with the specification.’” *In re Smith Int’l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir. 2017) (quoting *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997)).

Accordingly, we are persuaded the Examiner erred in rejecting claim 2 and dependent claims 3–8 for similar reasons.

Because this issue is dispositive regarding the Examiner’s error in rejecting these claims, we need not address Appellants’ other arguments.

Claim 9

We do not sustain the Examiner’s rejection of claim 9 (Final Act. 7), which recites, in pertinent part, “a comparator including the one or more processors configured to compare the quantified amount with the pre-determined threshold.”

The Examiner finds that Toms discloses the recited comparison functionality. Final Act. 7 (citing Toms ¶ 14); Ans. 16. According to the Examiner, the amount of quantum dots delivered is “the quantifying amount in the tissue.” Ans. 16. Appellants argue “there is no comparison with a threshold or providing a recommendation based on the comparison.” App. Br. 15. We agree.

Toms’ discloses the amount of quantum dots delivered to a living subject is no less than a threshold concentration of the quantum dots. Toms ¶ 14. Even assuming Toms’ delivery of an amount of quantum dots no less than the threshold concentration involves a comparison to the threshold concentration, the Examiner has not shown a comparator including one or

more processors that compares the delivered quantum dots with the threshold concentration.

Therefore, we are persuaded that the Examiner erred in rejecting claim 9. Because this issue is dispositive regarding the Examiner's error in rejecting these claims, we need not address Appellants' other arguments.

Claims 15 and 18

We sustain the Examiner's obviousness rejection of independent claim 15. Final Act. 8–9. The Examiner finds Toms discloses many recited elements of independent claim 15 including, among other things, (1) obtaining contrast enhanced image data indicative of tissue of interest and (2) quantifying an amount of contrast material for a tissue of interest. Final Act. 8 (citing Toms ¶¶ 10, 71).

Appellants contend that Toms does not at least suggest quantifying an amount of contrast material. App. Br. 17. We disagree. Toms discloses preoperatively delivering an effective amount of optical nanoparticles to tissues. Toms ¶ 10. For example, “[animals] were injected intravenously with 3.4, 8.5, or 17 nanomoles of quantum dots.” *Id.* ¶ 114. Toms' quantum dots are used as a contrast agent. *Id.* ¶ 13. Toms, then, at least suggests quantifying an amount of quantum dots (the claimed “contrast material”) for a tissue of interest.

The Examiner also finds Toms discloses generating a signal indicative of a recommendation. Final Act. 8 (citing Toms ¶ 70); Ans. 17 (additionally citing Toms ¶¶ 7, 74). Appellants contend that Toms does not at least suggest generating a signal indicative of a recommendation. App. Br. 17. We disagree. Toms' *in vivo* detection method provides guidance in a

surgical procedure. Toms ¶ 70. Toms’ optical nanoparticles are imaged using an intra-operative optical imaging technique. *Id.* ¶ 74. “When the optical nanoparticles are detected, surgical excision, biopsy, or resection of the neoplasm (e.g., brain tumor) can be guided by the optical imaging.” *Id.* Toms’ detection of optical nanoparticles, then, at least suggests a generated signal indicative of a recommendation.

Although the Examiner acknowledges that Toms’ tissue of interest is not scar tissue created by ablation, the Examiner cites Weide in combination with Toms for teaching this feature in concluding that the claim would have been obvious. Final Act. 8 (citing Weide ¶¶ 128, 150). That is, the Examiner cites Weide merely to show that applying Toms’ method where the tissue of interest is scar tissue created by ablation would have been obvious. Therefore, Appellants’ argument that Toms does not teach quantifying an amount of contrast material representing scar tissue created by ablation (App. Br. 16–17; Reply Br. 10) is unavailing because the rejection is not based solely on Toms, but rather on the cited references’ collective teachings. *See Merck*, 800 F.2d at 1097.

Appellants’ argument that Weide does not teach quantifying an amount of contrast agent (App. Br. 17) is inapposite because Weide was cited for teaching scar tissue created by ablation. Appellants’ contention that Weide does not teach scar tissue (App. Br. 16) is unavailing for the reasons discussed above for claim 1. Appellants’ contention that Weide does not disclose a contrast agent representing scar tissue because “[p]erfusion or bleeding is not representative of scar tissue and does not suggest or imply scar tissue” (App. Br. 16) is unavailing for the reasons

discussed above with respect to claim 1 regarding the proper construction of “scar tissue” as well as Weide’s explicit disclosure of detecting various type of changes to ablated tissue. *See Weide ¶¶ 126–132.*

Accordingly, we sustain the rejection of independent claim 15 and claim 18 which depends from claim 15.

Claims 16 and 17

Claim 16 recites, in pertinent part, combining a contrast image and a structural image. The Examiner finds claim 16 is similar to claim 2 and relies on the findings provided for claim 2. *Ans. 17; see also Final Act. 9.* Accordingly, for the reasons discussed above, we do not sustain the Examiner’s rejection of claim 16, and claim 17 which depends from claim 16.

Claims 19 and 20

Claim 19 recites, in pertinent part, “the contrast material includes a nano-particle contrast material targeted to at least one of the scar tissue [sic].”

Appellants’ arguments that Toms does not teach scar tissue created by ablation (*App. Br. 19; Reply Br. 11*) is unavailing because the rejection is not based solely on Toms, but rather on the cited references’ collective teachings as discussed above. *See Merck, 800 F.2d at 1097.*

Accordingly, we sustain the Examiner’s rejection of claim 19, and claim 20 which depends from claim 19.

Note Regarding Construction of Claim 1

We note claim 1 recites a “quantifier” and a “recommender,” which appear to be simply nonce words or “non-structural generic placeholders”

tantamount to the term “means” because they fail to connote sufficiently definite structure and, in the context of claim 1, invoke 35 U.S.C. § 112, sixth paragraph. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015); *see also* MPEP § 2181(I) (citing *Ex parte Rodriguez*, 92 USPQ2d 1395, 1404 (BPAI 2009) (precedential)); *Examining Computer-Implemented Functional Claim Limitations for Compliance with 35 U.S.C. 112*, 84 Fed. Reg. 57 (Jan. 7, 2019).

Relatedly, general purpose processors, such as claim 1’s “one or more processors,” recited solely in functional terms may invoke 35 U.S.C. § 112, sixth paragraph. *See Aristocrat Techs. Austl. Pty v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008). Notably, expanded panels of this Board have held that the term “processor” is a nonce word or “non-structural generic placeholder” because it is “a general purpose computer, a central processing unit (‘CPU’), or a program that translates another program into a form acceptable by the computer being used.” *Ex parte Lakkala*, No. 2011-001526 (PTAB Mar. 13, 2013) (informative); *see Ex parte Erol*, No. 2011-001143 (PTAB Mar. 13, 2013) (informative); *Ex parte Smith*, No. 2012-007631 (PTAB Mar. 14, 2013) (informative).

The Examiner did not articulate a construction under 35 U.S.C. § 112, sixth paragraph, and we will not speculate in that regard here in the first instance on appeal. We leave this question to the Examiner. Should the Examiner determine the claims invoke 35 U.S.C. § 112, sixth paragraph, the Examiner should review the Specification for supporting structure (e.g., an algorithm) to perform the specified functions of the quantifier and recommender, which include the one or more processors, sufficient to render

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the claims definite and enabled for their full scope under 35 U.S.C. § 112. *See Aristocrat*, 521 F.3d at 1333; *see also Finisar Corp. v. The DirecTV Group, Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008).

CONCLUSION

Under § 101, the Examiner did not err in rejecting claims 1, 2, and 4–20, but erred in rejecting claim 3.

Under § 103(a), the Examiner did not err in rejecting claims 1, 10–15, and 18–20, but erred in rejecting claims 2–9, 16, and 17.

DECISION

We affirm the Examiner’s decision to reject claims 1, 2, and 4–20.

We reverse the Examiner’s decision to reject claim 3.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 41.50(f).

AFFIRMED-IN-PART